Multi Display Setup Manual

<Ver1.0>

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Business Solutions Equipment Division
Business Solutions Dept.
SHARP Corporation

SHARP CONFIDENTIAL

About the handling of this material / Contents

Handling this material

- This document is made to explain the installation know-how of large size display for our business partners. Hence, please handle this material very carefully.
- This document describes basic notes to install and use the display for long term reliable service.

[Warning]

This document is to explain the installation know-how to our business partners. Please be careful not to distribute this document or its contents to other companies, or divert (use) it towards competitors' models.

In addition, please be reminded that values and expressions on this document are subject to change without notice.

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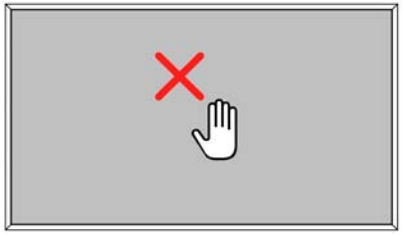
7. Tools for supporting installation

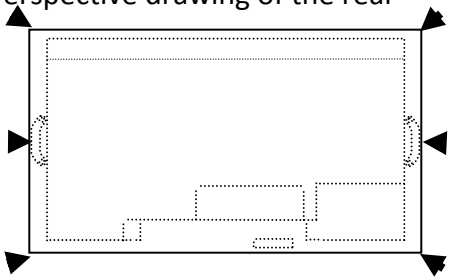
Precautions of installation and handling (1)

Precautions for Installation and moving

Display surface



Perspective drawing of the rear



▶Grip Points

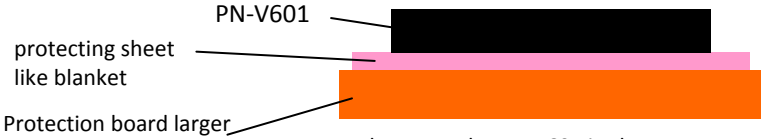
side view

The display surface is made of glass. Please use rear handgrip or handle by the edge of the display while installing and moving. It is possible to cause damage and malfunction of display.

Please don't apply physical pressure to the bezel such as bending or pulling on the bezel.

-Do not set the PN-V601 on a protection board smaller than itself to avoid the contact with corner of the board.
- Use a protecting sheet like blanket

- Do not apply force from the above.



Please set the PN-V601 in the center of the protection board/protecting sheet and be careful to avoid the contact with corners of the board.

Prior to installing the PN-V601, please refer to following items carefully in order to use PN-V601 for long term reliable service.

Please use rear handgrip or handle by the edge of the display in installing and moving. Please don't handle any other part of the display. The PN-V601 is high – density product so that please pay attention **not** to let the edge of PV-V601 support the entire weight load. Please take extra caution to make sure that weight load each display is supported only by the mounting system and not a neighboring display when building a multi-screen wall.

Method of interim storage of the display after taking it out from the box
-Interim storage using the temporary stand is recommended.
- When you must keep the LCD surface side down without temporary stand, please prepare a protection board larger than the display, and put a protecting sheet like blanket on it, and confirm enough there are neither debris nor a projection within the range where the LCD surface side comes in contact directly. Please execute the work only after the greatest care is taken so that the LCD surface should not hit the edge of the protection board underneath.

Precautions of installation and handling (2)

Overall precaution and handling

- Do not use the information display under following conditions ;
  1) Usage beyond its capability, feature/function, accuracy/precision
  2) Usage that could develop into injury or life-threatening situation under product breakdown
  3) Usage that could lead to major monetary damage

  We will not take any responsibility if the product was used under above conditions.
  <Example>
  Control of all types of safety related usage of transportation equipment (air plane, train, car, etc.), aerospace equipment, communication equipment, nuclear control equipment, medical equipment, disaster-prevention/security equipment, all types of safety equipment, etc.

- We will not take any responsibility for any failure, damage, loss, etc. which arise from particular installation (high-ceiling mounting etc.) and/or installation by non-Sharp related parties. Prior to the installation, please examine the potential problems by the installation location and installation method, and only operate within the appropriate environment.

In case of product failure, regardless of warranty period, removal and installation expenses incurred will be the customer's responsibility.
Repairing may take a certain time period. For that reason, arranging of a back-up is recommended.

- Installation environment of the information display differs by individual cases. Please make appropriate installation by referring to this material. If you have any difficulty in making judgment about installation or have any comments/questions about the contents of this material, please ask SHARP Business Solution factory via your local Sharp sales window.

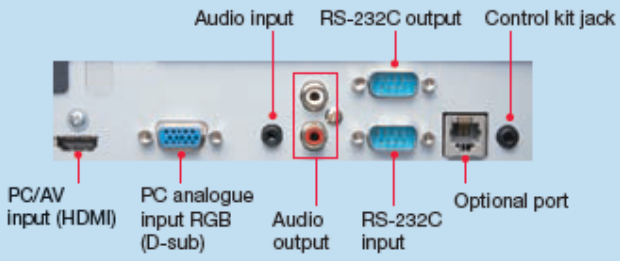
Please refer the PN-V601 Installation Guidelines for other precautions.

Mechanical installation (Optional Interface board)

Optional Interface board PN-ZB02

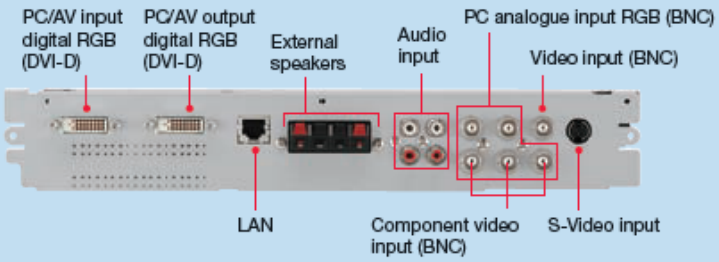
PN-V601 has following input/output terminals.

Input/Output Terminals (standard)



Additional terminals such as DVI-D input/output, Component, LAN etc.. are available by attaching the optional expansion board PN-ZB02.

PN-ZB02 Interface Expansion Board (option)



■Installation Procedure

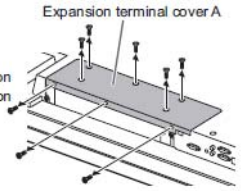
Caution

- This product must be Installed and removed by your local Sharp dealers or service engineers.
- Do not touch the connectors of this product and LCD MONITOR. The static electricity in your body may cause breakdown.
- Touch a grounded source to discharge the static electricity in your body before starting operation.
- The illustrations in this manual are for explanatory purposes and may not exactly represent the actual product.

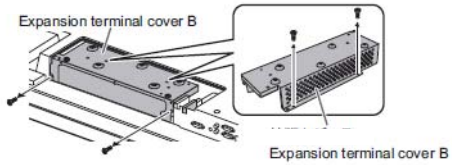
1. **Set the main power switch of the monitor to "off" and disconnect the power from the wall outlet.**

2. **Spread a thick and soft cloth (such as a blanket) on a level surface, such as a table, and place the monitor on it with its LCD panel facing downward.**

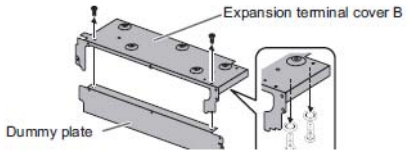
3. **Remove the expansion terminal cover A.**
   Remove 8 screws.
   For the location of the expansion terminal cover A, refer to the operation manual of the LCD MONITOR.



4. **Remove the expansion terminal cover B.**
   Remove 4 screws.

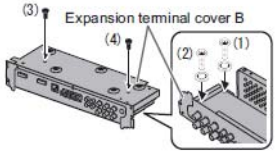


5. **Remove the dummy plate.**
   Remove 4 screws.

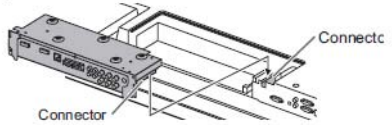


Give the dummy plate to the customer and ask them to store it.
Always install the dummy plate after removing the expansion board.

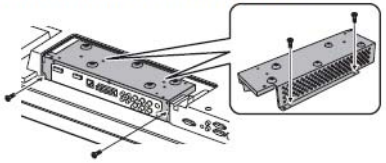
6. **Attach the expansion terminal cover B on the expansion board.**
   Secure the cover with the 4 screws removed in Step 5.
   Apply the screw in order from (1) to (4).



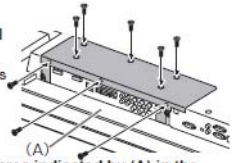
7. **Attach the expansion board.**
   Fully insert the connector.



8. **Secure the expansion board.**
   Secure the cover with the 4 screws removed in Step 4.



9. **Attach the expansion terminal cover A.**
   Secure the cover with the 8 screws removed in Step 3.



10. **Affix the terminal label in the area indicated by (A) in the above illustration.**

Mechanical installation (Remote Control kit)

How to attach Remote Control

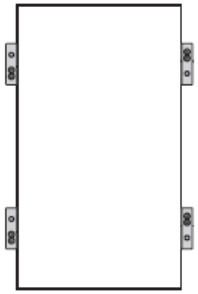
All monitors can be operated using one remote controller when one of the monitors is fitted with a remote control sensor box

Attach the remote control sensor box to one of the areas listed below.

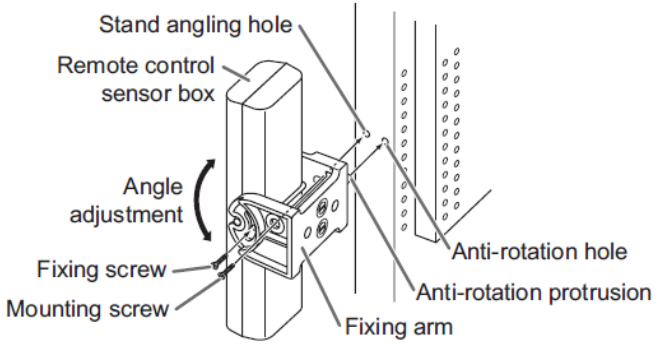
* When attached to the left side, because the top and bottom for the remote control sensor box will be reversed (the connection cable will be on top), the right side is recommended.

For the monitor in horizontal orientation

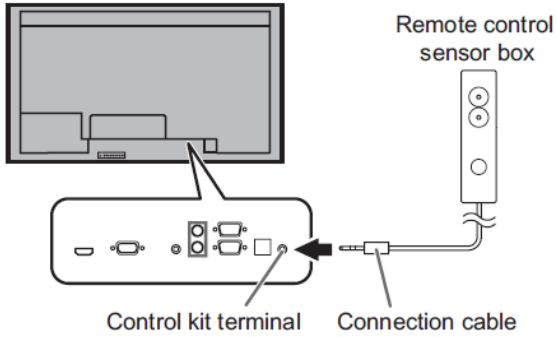
For the monitor in vertical orientation



1. **Insert the anti-rotation protrusion of the fixing arm into the anti-rotation hole of the monitor.**
2. **Secure the stand angling hole of the monitor with the mounting screw.**
3. **Adjust the angle of the remote control sensor box, and secure it with the fixing screw, so that it may accurately receive signals from the remote control unit.**



4. **Insert the remote control sensor box connection cable into the control kit terminal.**



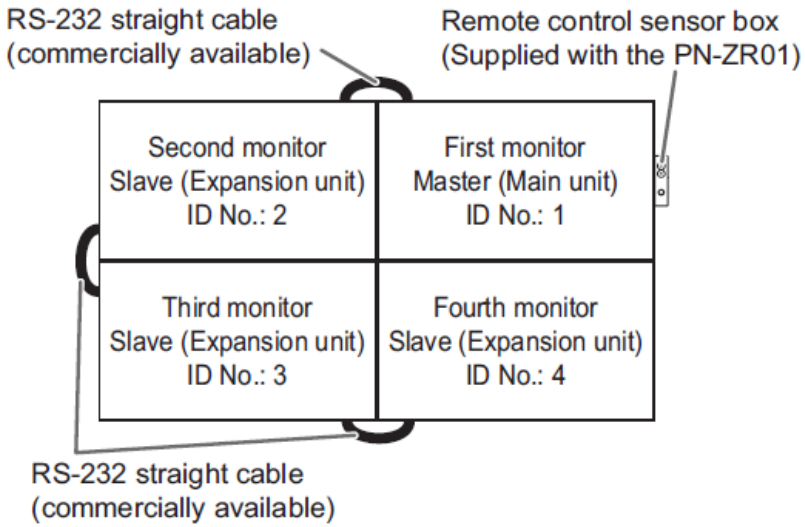
* Do not connect the cable after extending it with a commercially available cable.

Setting for Remote Control (1)

Setting for Remote Control kit

The monitors can be aligned and used as a large screen.

[Example] Connecting 4 monitors together with RS-232 cables.

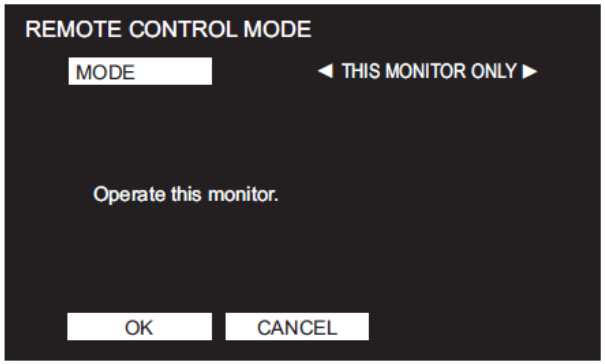


With the remote control unit it's possible to perform operation of...

- The primary monitor
- Monitors with a specified ID No.
- All primary/secondary monitors

It's necessary to specify which type of operation will be performed in advance.

1. **If using the remote control unit, press MODE for approx 5 seconds.**
   If using the monitor buttons, hold both MENU and ▲+ at the same time on the primary.



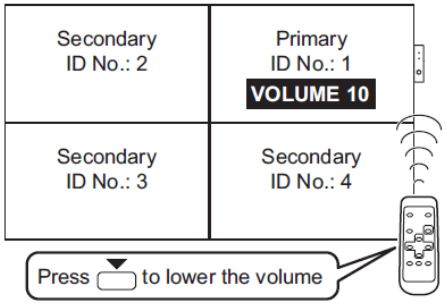
2. **Press ◄ or ►, select the mode, then perform settings.**

Setting for Remote Control (2)

THIS MONITOR ONLY

Performs operation of only the primary using the remote control unit.

[Example] If the volume is lowered, the volume of the primary will lower.



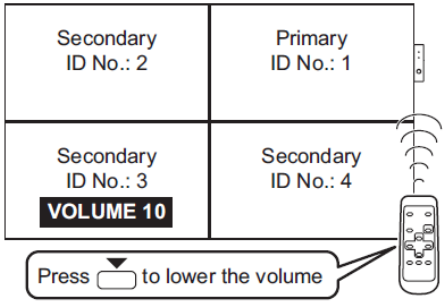
SPECIFIED MONITOR

Performs operation of a monitor with a specified ID No. using the remote control unit.

Press or to select ID No., then press or to select the ID No. of the monitor that you will operate.

* When it receives signals from the remote control unit, "Operating specified monitor." will be displayed on the primary screen.

[Example.] If ID No. is set to 3 and the volume is lowered, the volume of the monitor for ID No.: 3 will lower.



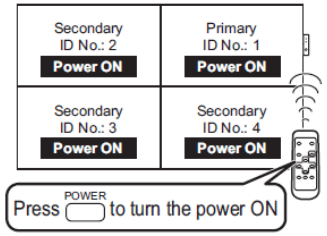
When you would like to confirm the ID No. that is set to the monitor, press or to select ID No. DISPLAY, then press . The ID No. will be displayed on the screen.

ALL MONITORS

Performs operation of all primary/secondary monitors.

* [ALL] will be displayed on the menu of the primary.
* When it receives signals from the remote control unit, "Operating all monitors." will be displayed on the secondary screen. (Excluding power and input mode selection operation)
* Settings may not be reflected depending on the state of the connected monitors.

[Example] If the power for the primary is turned ON, the power for all the monitors will be turned ON.



Press or to select EXPAND ITEM, and press or to select to perform this action or not.

OFF ..... For all monitors, only power, input mode selection, and product information display operations will be recognized.

ON ..... For all monitors, all operations will be recognized.
After returning to the normal screen with procedure 3, when 5 minutes have passed from the end of operation, it will automatically return to OFF.
[ALL [EXPAND ITEM]] will be displayed on the menu of the primary.
* Even when REMOTE CONTROL MODE is set to ALL MONITORS, certain settings such as LAN settings and ID No. settings will not be reflected on the other monitors.

3. Press or to select OK, then press MENU and return to the normal screen.

4. Perform operation.

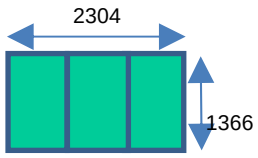
Basic display method (Enlarge or Dot by Dot)

Resolution for Enlarge mode and Dot by Dot configuration

Dot-by-dot mode

Enlarge mode

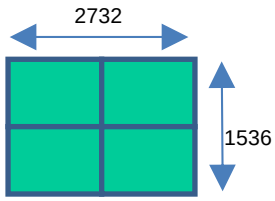
1x3



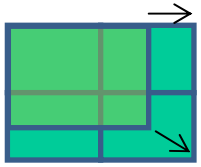
Create contents with 2304x1366 pixels (or 16:9.5 aspect ratio under dot-by-dot)*

The enlarge mode in this this configuration won't work because aspect ratio will be different from original the one.

2x2

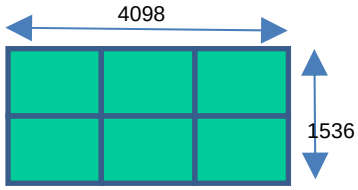


Create contents with 2732x1536 pixels (or 16:9 aspect ratio under dot-by-dot)*



Enlarge 1920x1080 contents to 2732x1536.

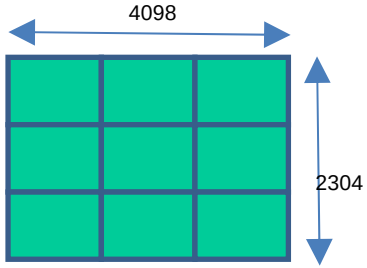
2x3



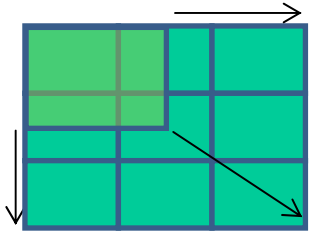
Create contents with 4098x1536 pixels (or 16:6 aspect ratio under dot-by-dot)*

The enlarge mode in this this configuration won't work because aspect ratio will be different from original the one.

3x3



Create contents with 4098x2304 pixels (or 16:9 aspect ratio under dot-by-dot)*



Enlarge 1920x1080 contents to 4098x2304

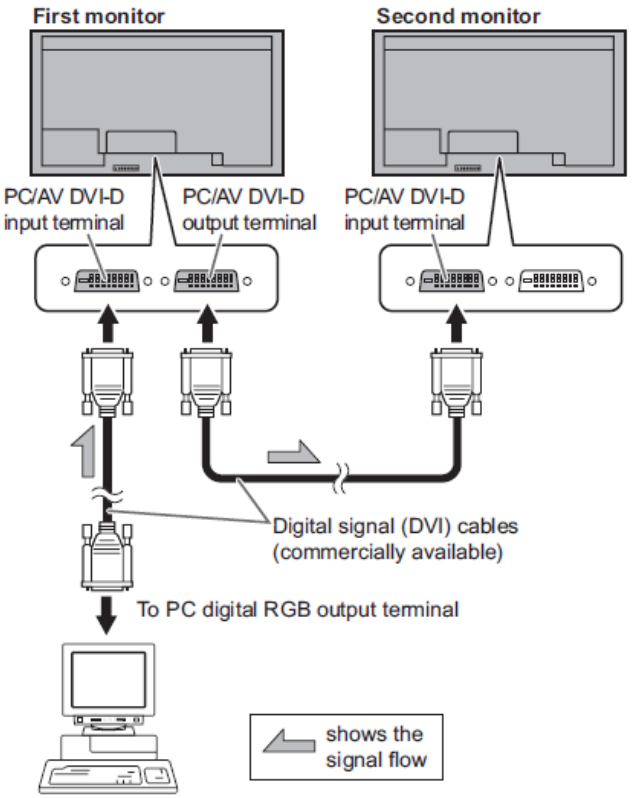
*: When the contents can not be created with dot-by-dot mode ie. moving picture.

Cable routing (for Enlarge mode)

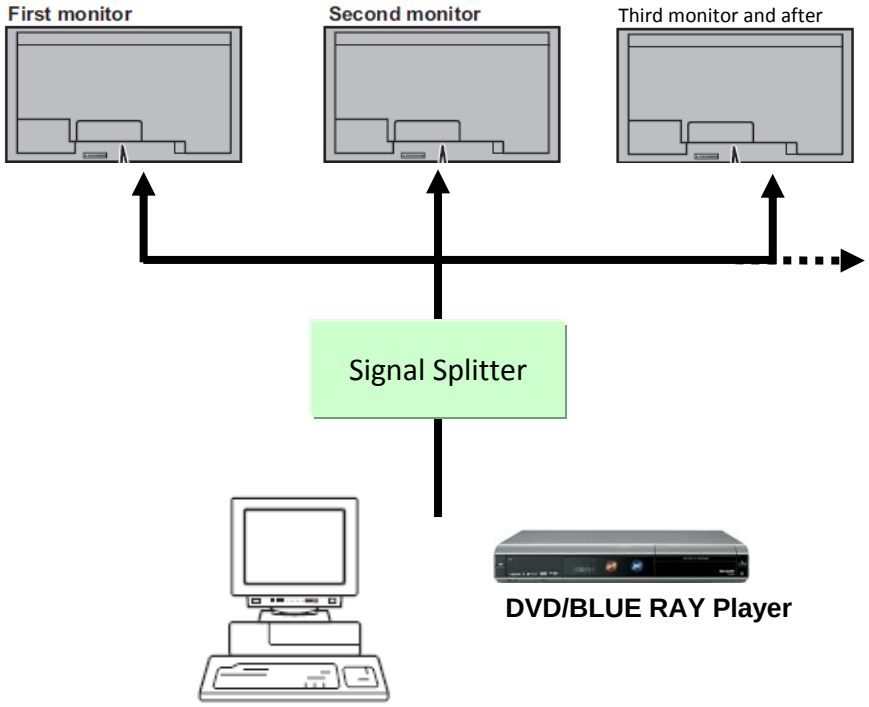
Cable configuration for Enlarge mode

1) DVI Daisy chain

May vary depending on the system being used.
If using the PC/AV DVI-D terminal, up to 5 monitors can be connected in a daisy chain. (When the PN-ZB02 is attached)



2) Other input (HDMI/RGB/Component) and DVI connection in case of more than 6 monitors.



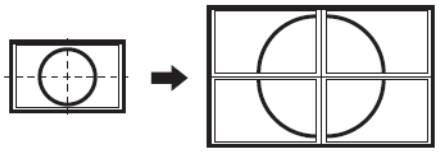
Please refer to the user manual for detailed connection information of the signal splitters.

Enlarge mode setup

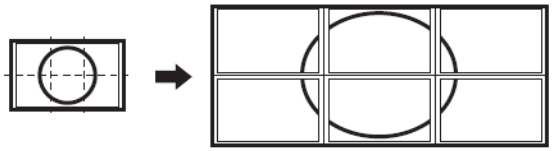
Enlarge mode setup with OSD

- You can align several monitors and integrate them into a single large screen to display.
- Up to five monitors can be aligned in both the horizontal and vertical directions.
- Each monitor displays enlarged views of separated images.

(Example)
Horizontal direction: 2 monitors
Vertical direction: 2 monitors



Horizontal direction: 3 monitors
Vertical direction: 2 monitors



Setting procedure

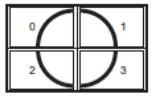
Set using the MULTI menu.

1. **Set ENLARGE to ON.**
2. **Select ADVANCED** (ENLARGE).
3. **Set the number of monitors aligned in the horizontal direction in ENLARGE H.**
4. **Set the number of monitors aligned in the vertical direction in ENLARGE V.**
5. **Set the section of the separated image to be displayed on each monitor in ENLARGE-POS.**
   1) **Press** ▶.
   2) **Press** ▲, ▼, ◀ **or** ▶ **to select position, then press** MENU.

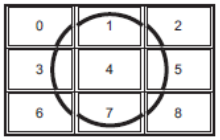
- IMAGE POSITION (EPOS) setting

In horizontal orientation

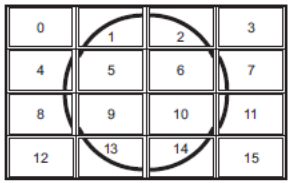
2 x 2



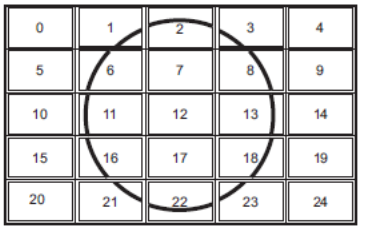
3 x 3



4 x 4

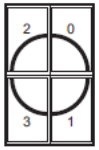


5 x 5

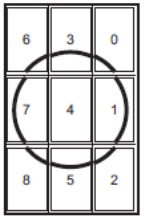


In vertical orientation

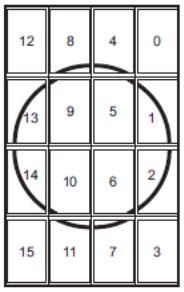
2 x 2



3 x 3

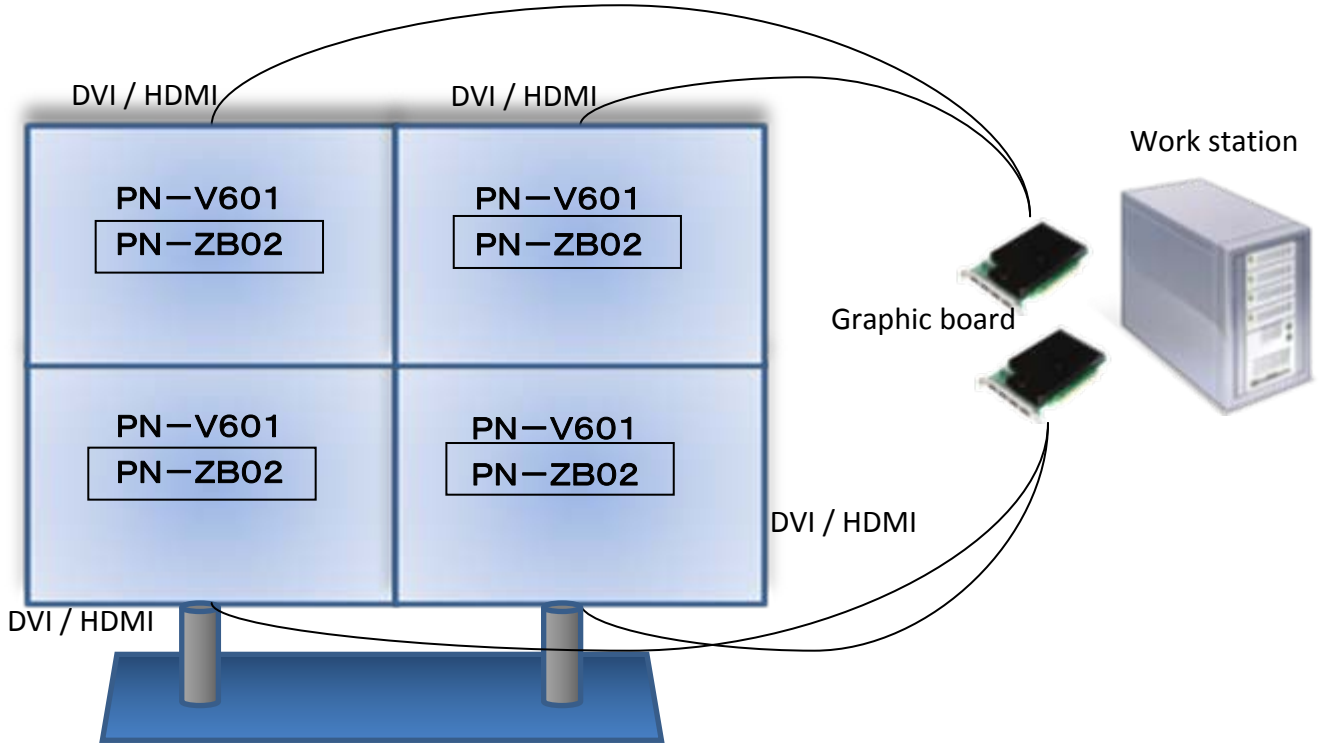


4 x 4



Cable routing (for Dot by Dot configuration)

Cabling for Dot by Dot



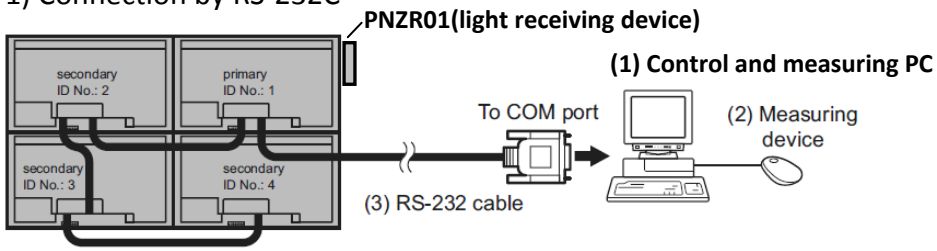
Graphic boards which have multiple out put terminals are necessary to realize dot by dot display.
Each monitor needs to be connected via DVI or HDMI to a dedicated port on the graphic cards.
Multi display setup depends on the type of graphic board and graphics driver.
Please refer to the details supplied in the graphic board manuals.

Cable routing for monitor control

Cabling (for monitor control)

Three types of connections are available.

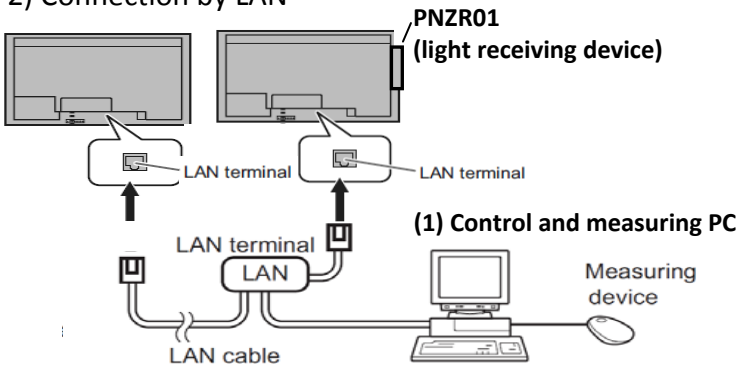
1) Connection by RS-232C



1. Choose RS-232C from RS-232C/LAN SELECT at the set up page of the all monitors in OSD menu
2. Assign a unique ID number to each monitor
3. Connect PC (1) and the first monitor with RS-232C straight cable (do not use a null-modem cable)
4. Make a daisy chain with RS-232C straight cables
5. Install monitor calibration tool and the drivers for the measuring device into PC (1).

*If you use the remote control in this configuration, please set PN-ZR01 (light-receiving device) to the first monitor.

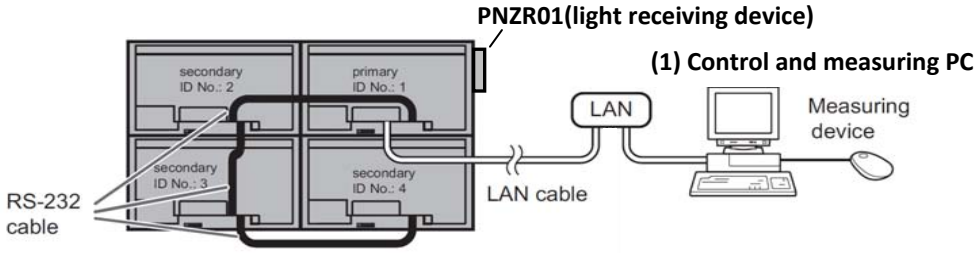
2) Connection by LAN



1. Choose LAN from RS-232C/LAN SELECT at the set up of the all monitors.
2. Assign unique IP address to each monitor. (static IP or DHCP)
3. Connect PC (1) and all monitors by LAN
4. Install monitor calibration tool and the drivers for the measuring device into the PC (1)

*If you use the remote control in this configuration, please set PN-ZR01 (light-receiving device) to the first monitor. And you need to make a daisy chain with RS-232C straight cables and assign unique IDs as well.

3) Mixed Connection by RS-232C and LAN



1. Choose LAN from RS-232C/LAN SELECT at the set up of the first unit.
2. Select RS-232C for 2nd monitor and each one after
3. Assign a unique ID number to each monitor
4. Connect PC (1) and the first monitor by LAN
4. Make daisy chain for all remaining monitors with RS-232C straight cable (do not use null-modem cables)
5. Install monitor calibration tool and the drivers for the measuring device into PC (1).

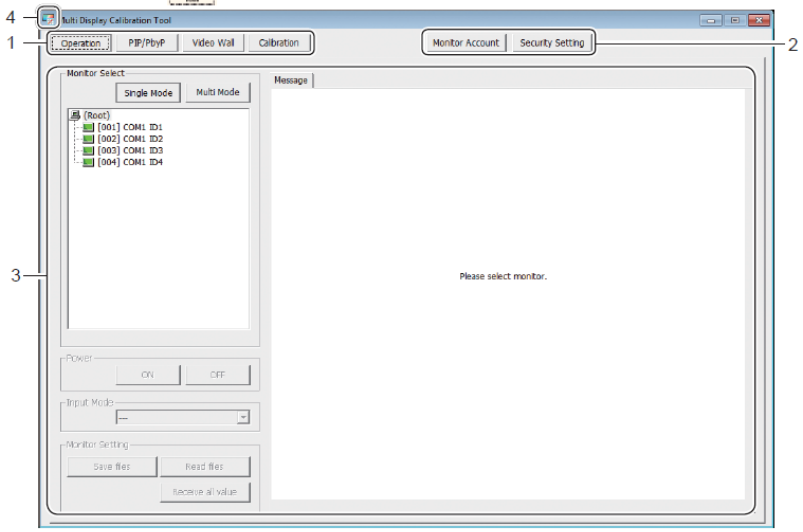
*If you use the remote control in this configuration, please set PN-ZR01 (light-receiving device) to the first monitor.

Monitor control software setup

Monitor control with calibration tool

●Starting the software

1. **Double-click the Multi Display Calibration Tool shortcut icon on the desktop.**



1) Function buttons

Operation	Used to set all of the configurations of the LCD MONITOR.
PIP/PbyP	Used to set the configuration of PIP/PbyP.
Video Wall	Used to adjust settings for multiple-monitor configuration and the enlarge function.
Calibration	Used to perform calibration and measurement; write past calibration data; change and write user gamma curve GUI; and display adjustment and measurement conditions.

2) Setting buttons

Monitor Account	Used to register/edit the individual LCD MONITOR.
Security Setting	Used to set the password and operating authority.

3) Main screen

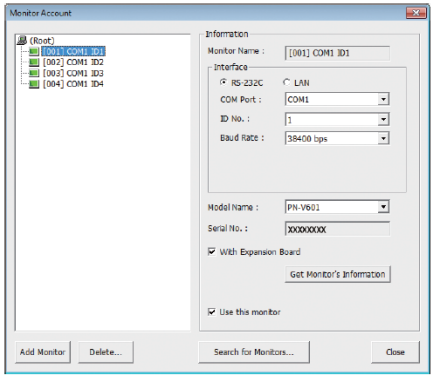
Used to adjust the LCD MONITOR.
The displayed contents will differ depending on the function button.

4) Version Information

Clicking and then clicking [Version Information] displays the software version information.

●Adding/editing an LCD MONITOR

1. **Click [Monitor Account].**
   The [Monitor Account] dialog box is displayed.
2. **To add a new LCD MONITOR to be controlled:**
   Click [Add Monitor].
   To change the existing setting:
   From the list, select the LCD MONITOR to change.
3. **Set each item.**
   1) Interface
   Select the connection method (RS-232C or LAN).
   When RS-232C is selected:
   Specify “COM Port”, “ID No.”, and “Baud Rate”.
   When LAN is selected:
   Specify “IP Address”, “ID No.”, and “Data Port”.
   When a user name and a password are required to access the LCD MONITOR, click [Register Password...] and specify “User name” and “Password”.



   2) Model Name/Serial No.
   Select the model name.
   By clicking [Get Monitor's Information] while the LCD MONITOR is connected, you can acquire the model name and serial number.
   For some models, a checkbox may appear. Select as appropriate for your LCD MONITOR.
   3) Use this monitor
   Set whether or not to adjust the LCD MONITOR in this software.
   Uncheck this box when you will not be adjusting the LCD MONITOR.
4. **Click [Close].**

Monitor control software setup

Monitor control with calibration tool

•Adding the LCD MONITOR automatically

The software automatically acquires the information and adds the monitor.

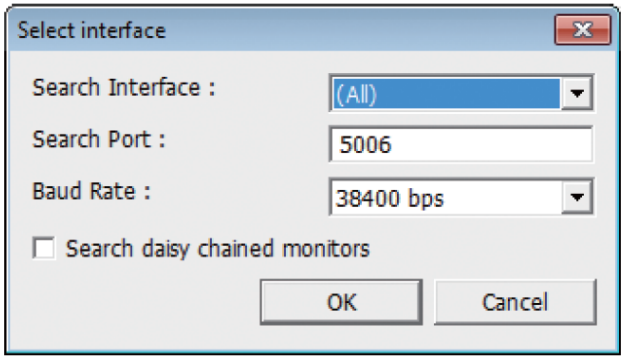
1. **Click [Monitor Account].**
   The [Monitor Account] dialog box is displayed.

2. **Click [Search for Monitors...].**

3. **Specify the interface used for the search for the LCD MONITOR.**
   - When “(All)” is selected, the software searches for all LCD MONITORs connected to COM ports or via LAN.
   - When “(All)” or “LAN” are selected, set the port number to search at “Search Port:”. Normally, specify “5006”.
   - In “Baud Rate”, specify the communication speed that is set in the LCD MONITOR.
   - If you want to obtain the information about daisy-chained LCD MONITORs, check the “Search daisy chained monitors” check box.

4. **Click [OK], and then close all dialog boxes.**

5. **Click [Close].**



<TIPS>
The parameters are different depending on the particular connection

1) Connection by RS-232C
   Search Interface : All
   Search daisy chained monitors: check

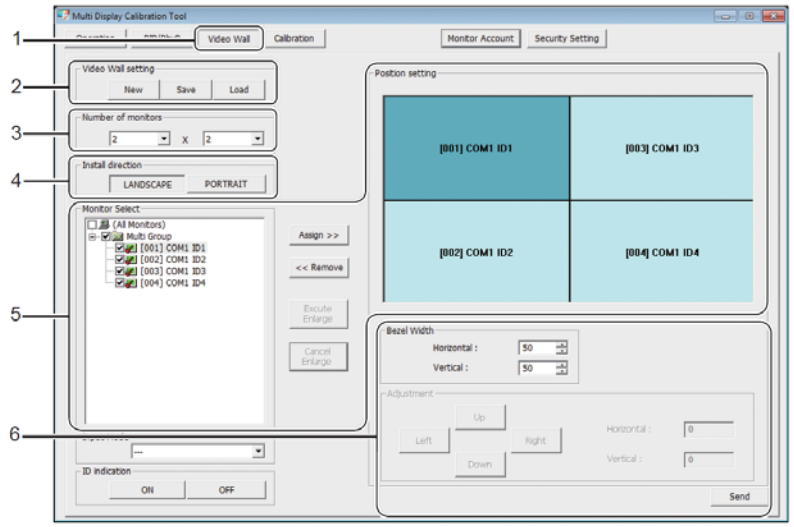
2) Connection by LAN
   Search Interface : LAN
   Search daisy chained monitors: uncheck

3) Mixed connection by LAN and RS-232C
   Search Interface : All
   Search daisy chained monitors: check

Calibration tool software setup

Setting Video Wall and Enlarge mode via the calibration tool

•Setting the Video Wall



1. **Click [Video Wall].**
2. **Click [New].**
3. **Select the number of monitors.**
4. **Select the install direction.**
5. **Specify the position of the LCD MONITORs.**
   1) Select the monitor from the Monitor Select list.
   2) Click on the position of the monitor in the Position setting area.
   3) Click [Assign >>].
      - You can also set the position of the monitor by dragging-and-dropping from the Monitor Select list to the desired position in the Position setting area.
      - To cancel the assignment, click the monitor in the Position setting area and click [<< Remove].
6. **Click [Send].**
   The Video Wall settings are complete.
   Normally, Video Wall can be used even if "Bezel Width" and "Adjustment" are not set.

TIPS

- When the ID indication area is clicked [ON], the number of the monitor name (three digits) will be displayed in each LCD MONITOR. The monitor name is automatically assigned when adding an LCD MONITOR in Monitor Account.
- After setting Video Wall, current information can be saved by clicking [Save].
- Using [Load], you can load previously saved settings.
- The monitors with completed Video Wall settings are registered to a group.
- When performing fine adjustments of the bezel width, after selecting the LCD MONITOR, adjust the bezel width in "Bezel Width" and click [Send].

•Setting Enlarge

1. **Using the steps 1-6 listed on page 9, set the Video Wall.**
2. **Select the range of monitors where enlargement will take place.**
   Drag and select the range of monitors where enlargement will take place in the Position setting area.
3. **Click [Execute Enlarge].**
4. **Click [Send].**
   The Enlarge setting is complete.

TIPS

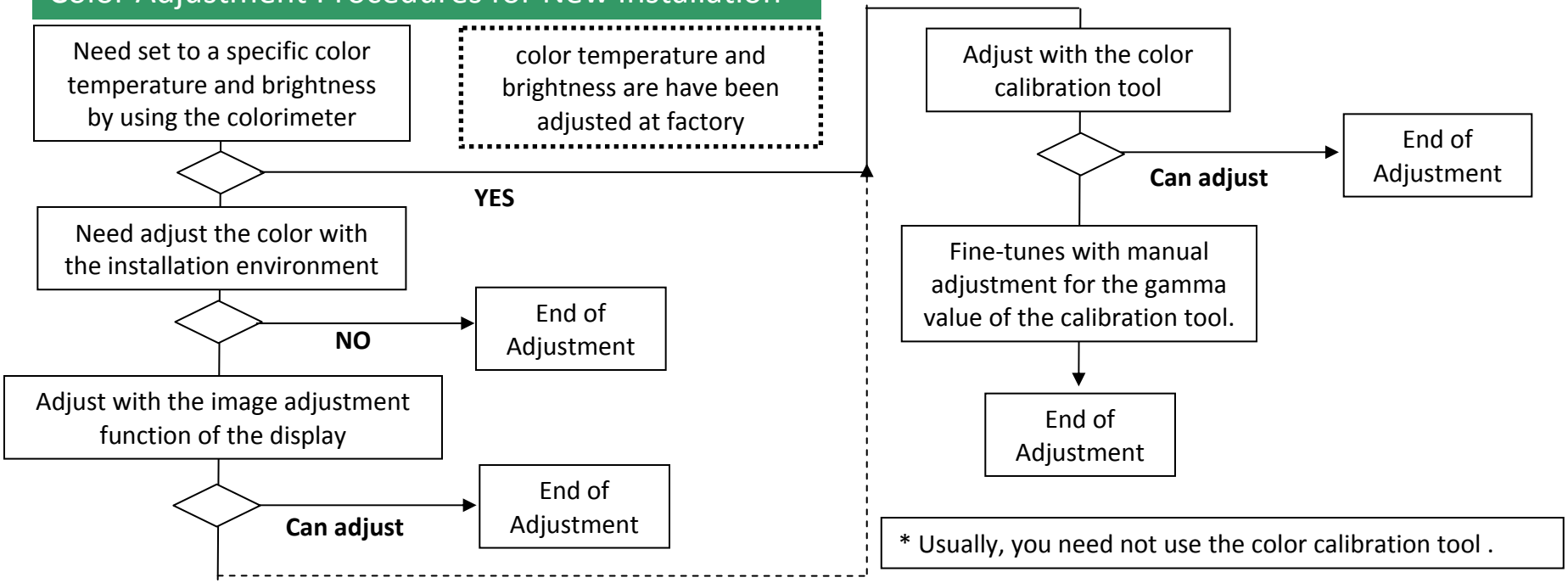
- To cancel Enlarge, click the monitor in the Position setting area and click [Cancel Enlarge].
- If a video signal has not been input, Enlarge cannot be set.

Calibration (1)

How to adjust the color

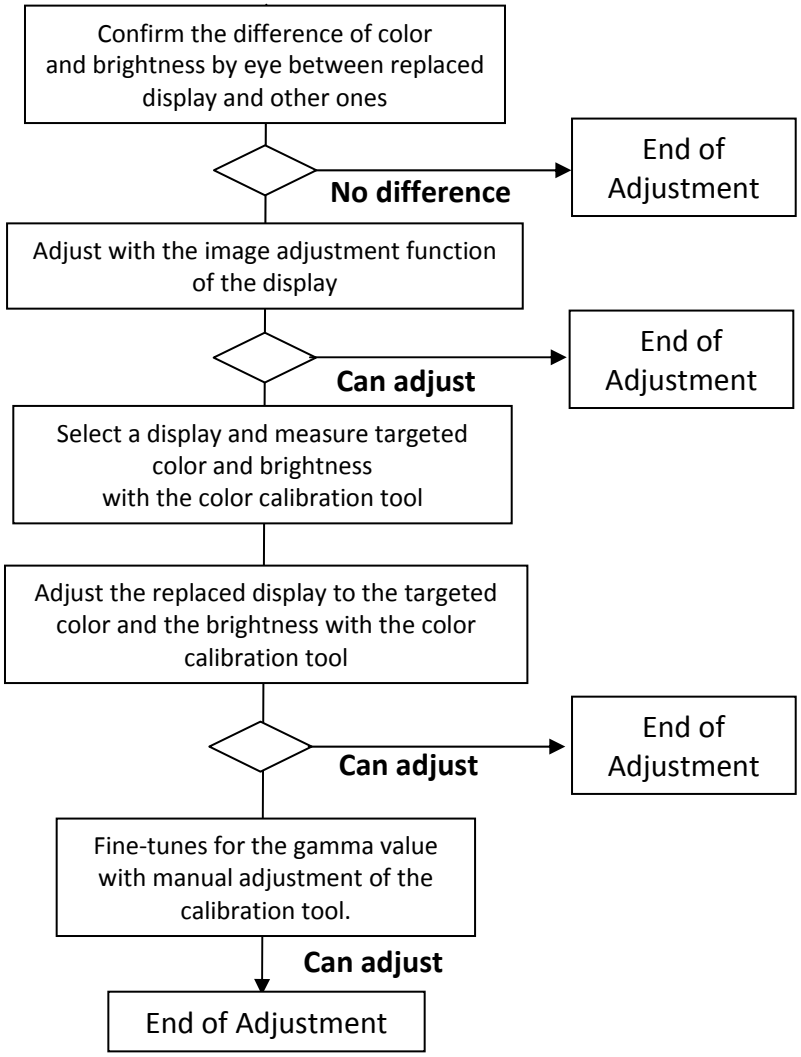
- The color can be adjusted by the image adjustment function of the display by operating remote controller or the control tool offered from our company.
  (Please refer to software tool SHARP Monitor Control Software.)
- Also, it can be adjusted with the color calibration tool from our company.
  (Please refer to software tool Multi Display Calibration Tool).
  It is necessary to buy our recommended colorimeter. For the adjustment of one unit, it will take about five minutes with 6-gradation adjustment of (our recommendation), about seven minutes with 16-gradation, and about 10 minutes with 32-gradation

Color Adjustment Procedures for New Installation

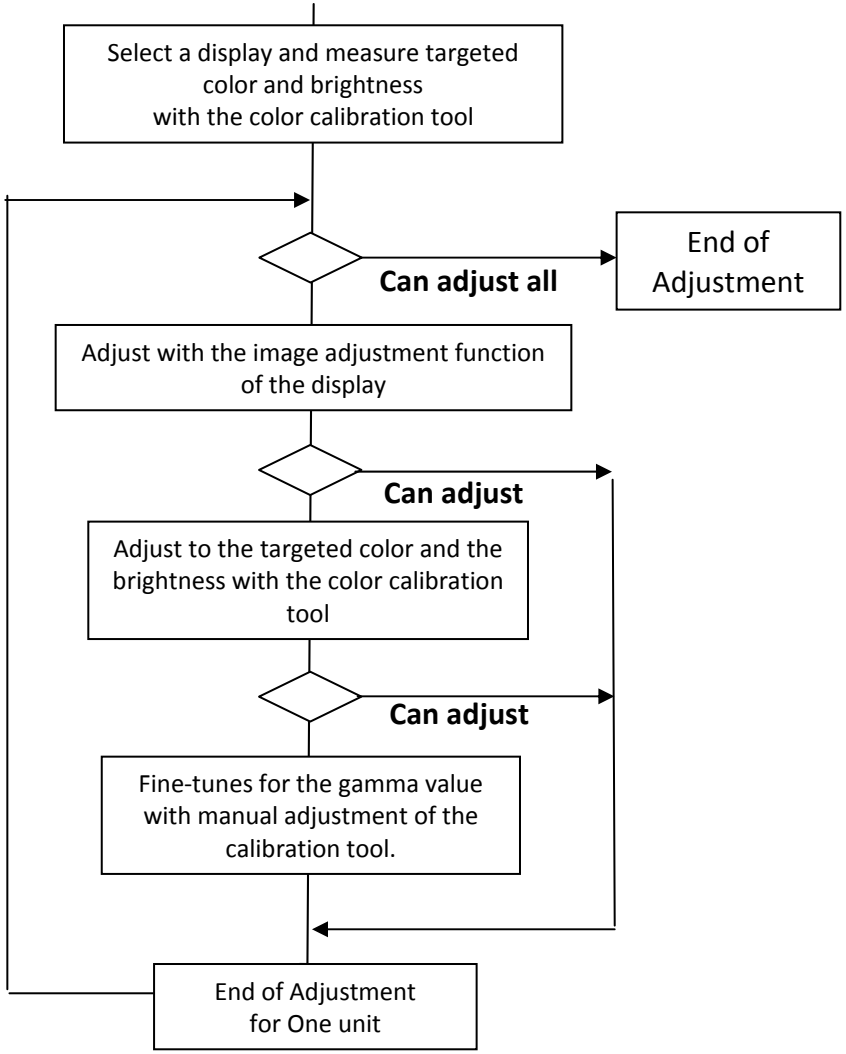

Need set to a specific color temperature and brightness by using the colorimeter
color temperature and brightness are have been adjusted at factory
YES
Need adjust the color with the installation environment
NO
End of Adjustment
Adjust with the image adjustment function of the display
Can adjust
End of Adjustment
Adjust with the color calibration tool
Can adjust
End of Adjustment
Fine-tunes with manual adjustment for the gamma value of the calibration tool.
End of Adjustment
* Usually, you need not use the color calibration tool .

Calibration (2)

color adjustment procedures when display is replaced


Confirm the difference of color and brightness by eye between replaced display and other ones
No difference
End of Adjustment
Adjust with the image adjustment function of the display
Can adjust
End of Adjustment
Select a display and measure targeted color and brightness with the color calibration tool
Adjust the replaced display to the targeted color and the brightness with the color calibration tool
Can adjust
End of Adjustment
Fine-tunes for the gamma value with manual adjustment of the calibration tool.
Can adjust
End of Adjustment

color adjustment procedures for difference of the color temperature and brightness between displays due to change over time

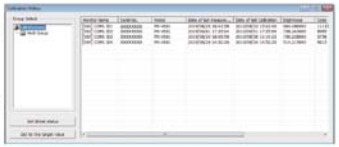

Select a display and measure targeted color and brightness with the color calibration tool
Can adjust all
End of Adjustment
Adjust with the image adjustment function of the display
Can adjust
Adjust to the targeted color and the brightness with the color calibration tool
Can adjust
Fine-tunes for the gamma value with manual adjustment of the calibration tool.
End of Adjustment for One unit

Calibration (3)

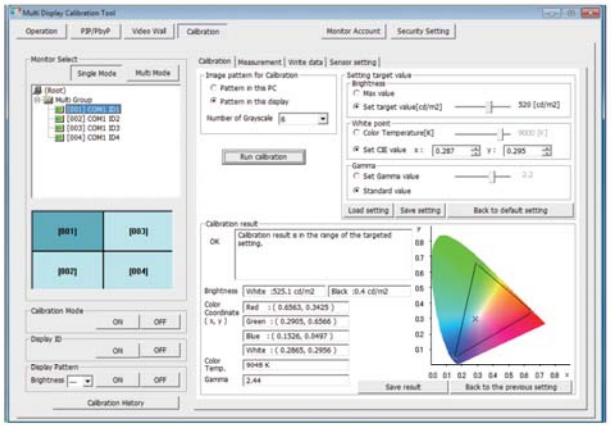
How to implement calibration

1. **Click [Calibration].**
2. **Click the [Sensor setting] tab.**
3. **Click [Execute] in "Format Sensor".**
4. **Click the [Calibration] tab.**
5. **Click the [Multi Mode], and then select all target LCD MONITORs in "Monitor Select" list.**
6. **Click [ON] in "Calibration Mode".**
   - When the LCD MONITOR is set to "POWER ON DELAY", a communication error may occur. If this occurs, click [Retry command].
   - Later, operate the LCD MONITOR after the brightness has been stabilized.
     The average amount of time it takes until the brightness stabilizes is 60 minutes.
   - If the LCD MONITOR is set to "POWER ON DELAY". disable "POWER ON DELAY".
7. **Select the monitor that will serve as a reference.**
   Decide the monitor to which the brightness and tone will be aligned.
   1) Click [ON] in "Display Pattern".
   2) Set "BRIGHT" of all the LCD MONITORs to the maximum value.
      In order to make it easy to understand differences in brightness, it is recommended to set "BRIGHT" to the maximum value.
   3) Visually check the monitors, and decide the monitor to which they will be aligned.
      Normally, select the darkest monitor.
      A dark-screened monitor cannot be aligned with a bright-screened monitor.
      If it is difficult to judge which is best, decide on a number of candidates, then make a selection after seeing the measured results using the following procedures.
   4) Click [OFF] in "Display Pattern".
8. **Measure the monitor that will serve as a reference, and decide the target value.**
   1) Click the [Measurement] tab.
   2) Click the [Single Mode], and then select the monitor that was selected in the previous step from "Monitor Select" list.
   3) Select [Image pattern for Calibration].
      Normally, use "Pattern in this display".
   4) Click [Run Measurement].
   5) If the screen on the right is displayed on the monitor, attach the measuring device to the mark in the center, and then click [Start].
      When measurement is complete, the results will be displayed in "Measurement result".
      If there are other monitors that you would like to measure, repeat operations (2)-(5).

   6) Click [Calibration History].
   7) The measurement results for the monitor will be listed. Select the monitor that will serve as a reference from the list and click [Set to the target value].
      Normally, select the darkest monitor.
      A dark-screened monitor cannot be aligned with a bright-screened monitor.



   8) Press in the upper-right, and close the screen.
9. **Execute calibration of the monitor.**



   1) Click the [Calibration] tab, and then select the monitor for which calibration will be performed from the "Monitor Select" list.
   2) Select [Image pattern for Calibration].
      Normally, use "Pattern in this display".
   3) Click [Run calibration].
   4) If the screen on the right is displayed on the monitor, attach the measuring device to the mark in the center, and then click [Start].
      Calibration is executed.
      When calibration is complete, the results will be displayed in "Calibration result".
   5) Click [Save result].
      You can save the calibration result.
      Perform operations (1)-(5) for all monitors.

10. **Click the [Multi Mode], and then select all the monitors that were selected in step 5 from the "Monitor Select" list.**
11. **Click [OFF] in "Calibration Mode".**

TIPS

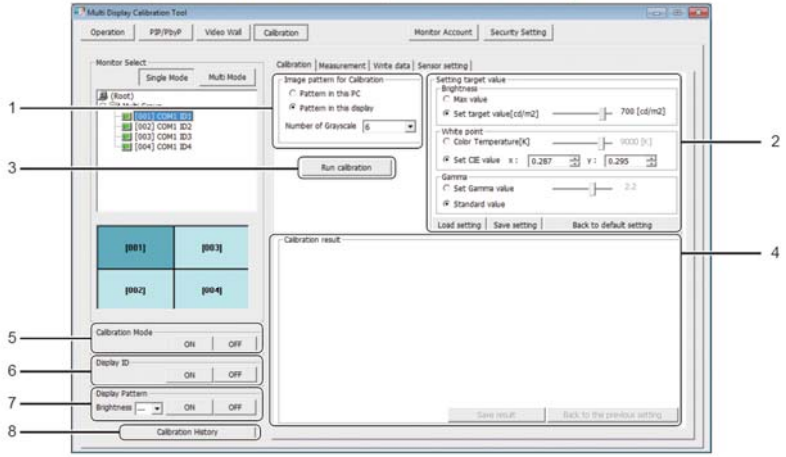
When [ON] in "Display ID" is clicked, the number of the monitor name (three digits) will be displayed on the LCD MONITOR.
Use this to confirm the target LCD MONITOR.
(The monitor name is automatically assigned when adding an LCD MONITOR in Monitor Account.)
If calibration fails, confirm the following points.
- Is the measuring device properly connected? Is it firmly attached to the screen?
- Is the LCD MONITOR that will serve as a reference correct? (Is the darkest LCD MONITOR currently chosen?)
- If setting the target value manually, is the target value correct?

Calibration (4)

How to implement calibration

●[Calibration] tab

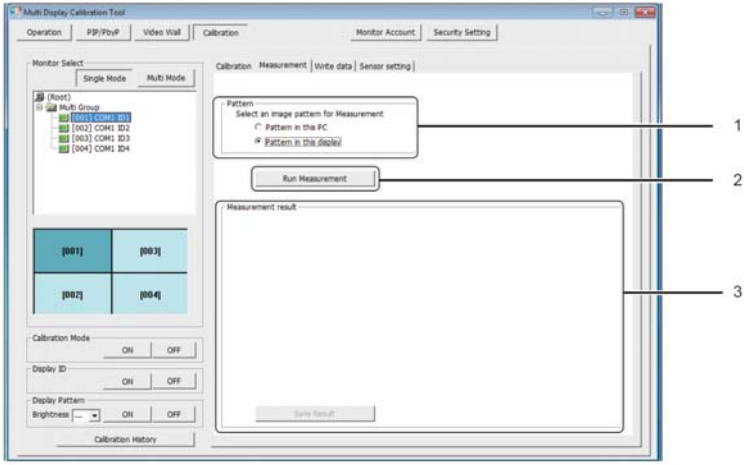
The Calibration tab specifies the target values and performs the calibration.
You can also save the target values to file and create settings from files with saved target values.



1. **Image pattern for Calibration**
   - Pattern in this PC: Outputs a pattern for measurement from the PC. When using this setting, it is necessary to input the video signal of the measuring PC to the LCD MONITOR.
   - Pattern in this display: Uses an LCD MONITOR internal pattern for measurement.
     * Normally, use “Pattern in this display”.
   - Number of Grayscale: Sets the number of grayscale levels. When the levels are increased, adjustments can be made with greater detail but this will take time. Normally, use “6”.
2. **Setting target value**
   - Sets the target values for brightness, color temperature, and gamma values. The set contents can be saved to file, and the saved settings file can also be loaded and set as target values.
   - When [Back to default setting] is clicked, brightness, color temperature, CIE values, and gamma values will return to recommended values.
   - Depending on the combination of settings, adjustment may not be possible.
3. **[Run calibration]**
   - Performs adjustments for the LCD MONITOR using the set target values.
4. **Calibration result**
   - Displays the calibration result.
   - When [Save result] is clicked, the result will be saved to file.
   - When [Back to the previous setting] is clicked, the LCD MONITOR settings will return to their pre-calibration state.
5. **Calibration Mode**
   - When [ON] is clicked, LCD MONITOR settings such as power and power management will be saved, and settings for performing calibration will change.
   - When [OFF] is clicked, settings will return to the saved settings.
6. **Display ID**
   - Displays the number of the monitor name (three digits) on the selected LCD MONITOR.
     The monitor name is automatically assigned when adding an LCD MONITOR in Monitor Account.
7. **Display Pattern**
   - Displays a white screen using an internal pattern in the selected monitor. It can also set the brightness of the LCD MONITOR.
   - Use to check the brightness and tone of the monitor.
8. **[Calibration History]**
   - Displays a list of executed calibrations.

●[Measurement] tab

The Measurement tab measures brightness, color coordinates, color temperature, and gamma values.



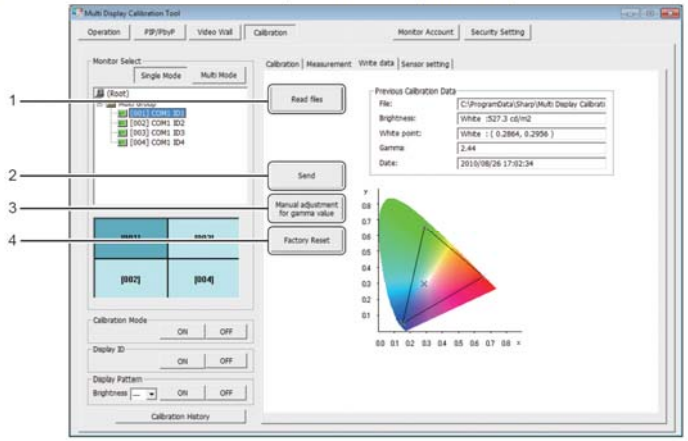
1. **Pattern**
   - Pattern in this PC: Outputs a pattern for measurement from the PC. When using this setting, it is necessary to input the video signal of the measuring PC to the LCD MONITOR.
   - Pattern in this display: Uses an LCD MONITOR internal pattern for measurement.
     * Normally, use “Pattern in this display”.
2. **[Run Measurement]**
   - Starts the measurement process
3. **Measurement result**
   - Displays the measurement results for brightness, color coordinates, color temperature, and gamma values.
   - When [Save Result] is clicked, the measurement results are saved as a calibration information file.

Calibration (5)

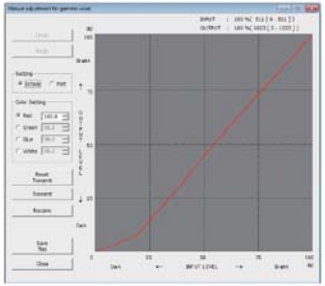
How to implement calibration

•[Write data] tab

The Write data tab reads measurement results and performs manual adjustments for gamma values.



1. **[Read files]**
   - You can read past measurement results, adjustment results, and user gamma adjustment files. The contents of the loaded files are displayed in "Previous Calibration Data" and in the data graph.
2. **[Send]**
   - Sends the currently loaded values to the LCD MONITOR.
3. **[Manual adjustment for gamma value]**
   - Displays the "Manual adjustment for gamma value" screen.



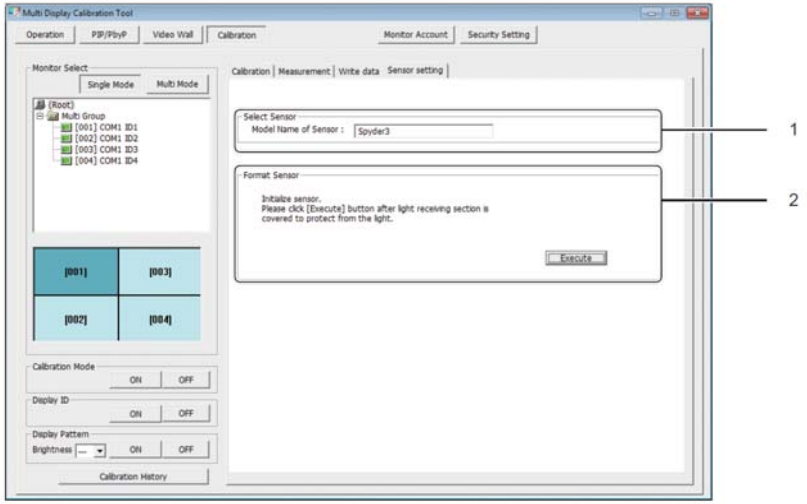
Manual adjustment for gamma value screen

- Undo: Returns to the previous state.
- Redo: Repeats the undone operation.
- Setting: Selects the target to be adjusted in "Color Setting".
  Whole - Adjusts all colors while maintaining all gamma curves.
  Part - Adjusts gamma data of a specific grayscale level.
- Color Setting: Adjusts the "Setting". Adjust after selecting the color that you would like to adjust. "White" collectively adjusts "Red", "Green", and "Blue".
  When "Whole" is selected, change the numerical values.
  When "Part" is selected, adjust the curve after dragging the gamma curve to the area that you would like adjust.
- Transmit: Transmits currently displayed gamma values to the LCD MONITOR.
- Receive: Reads and displays the gamma values of the currently selected colors from the LCD MONITOR.
- Save files: Saves currently displayed gamma values as a calibration information file.
- Close: Closes the Manual adjustment for gamma value screen

4. **Factory Reset**
   Returns the brightness and gamma to their factory preset values.

•[Sensor setting] tab

The Sensor setting tab performs initialization of the measuring device.



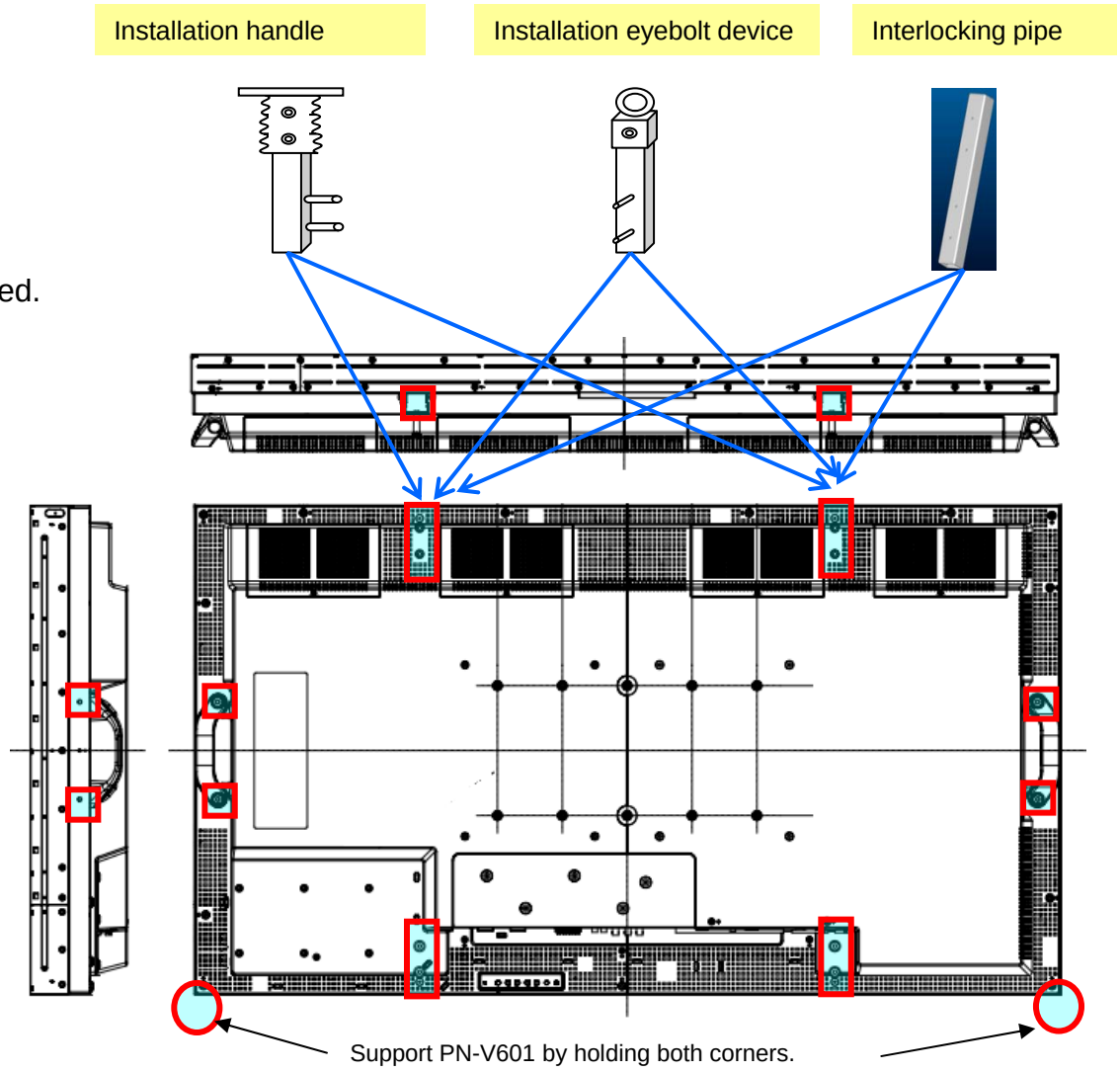
1. **Select Sensor**
   - Displays the currently connected measuring device.
2. **Format Sensor**
   - When [Execute] is clicked, the selected measuring device will be initialized.

Tools for supporting installation (1)

Installation tools for attachment and moving to the installation location

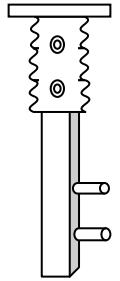
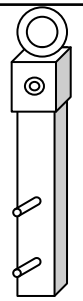
Please take care not to add pressure to parts other than the ones marked with a heavy line in the diagram during installation and maintenance.

If pressure is added to other parts, the display itself may be distorted or damaged.



Tools for supporting installation (2)

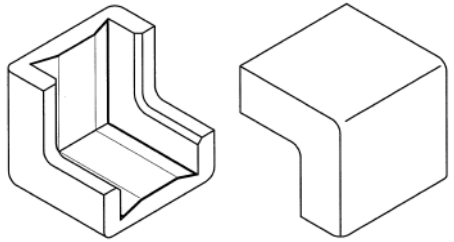
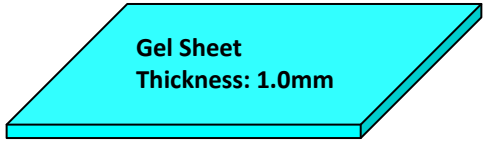
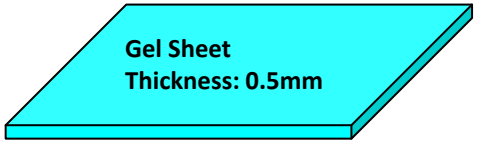
We will provide following service parts for installation (they are subject to fees)

Name (temporary)	Use	Image
Installation handle (UKOG1005MPZZ)	**- For lifting the PN-V601 up to a high location** This device is inserted into holes on top of PN-V601 and enable lifting the PN-V601 up to a high location during installation. 2 pieces of this device are necessary per one PN-V601. This installation handle is for improving efficiency of installation. Please use it if necessary.	
Installation eyebolt device (UKOG1006MPZZ)	- **For a crane to lift the PN-V601 up to a high location.** This device is inserted into holes on top of PN-V601 and enable lifting the PN-V601 up by crane. 2 pieces of this device are necessary per one PN-V601. This installation eyebolt device is for improving the efficiency of installation. Please use it if necessary.	
Interlocking pipe (UKOG-1007MPZZ)	-For making it easy to install PN-V601 It can reduce gap between the top-to-bottom of the PN-V601 and interlock each panel from both on the top and bottom of the PN-V601 when installing with a stand etc. This pipe can prevent PN-V601 from having excessive weight load from above and underneath. Please use this interlocking pipe for improving the accuracy when adjusting the vertical position of displays if necessary. It is not required for installation. 2 pieces of this pipe are necessary per one PN-V601.	

* if you need above tools, please contact delivery agent or our sales reps.

Tools for supporting installation (3)

We will provide following service parts for installation (they are subject to fees)

Name (temporary)	Use	Image
Protection cover for the corner of display (UKOG1008MPZZ)	-- Reduce shock while moving and installing These covers are attached on the two bottom corners of PN-V601 to protect PN-V601 from shock. It is easy to remove the cover. - 2 units of this cover are necessary per one PN-V601.	
Protection spacer (for landscape)	-Protection of display Insert this spacer between the PN-V601 while installing the neighboring PN-V601s. (thickness: 1 mm) This tool is used to avoid damage of the bezel at the time of installation and the position adjustment of the display. -Please take care that the sheet does not extend out of display side.	
Protection spacer (for Portrait)	-Protection of display Insert this spacer between the PN-V601 while installing neighboring PN-V601's. (thickness: 0.5 mm) This tool is used to avoid damage of the bezel at the installation and the position adjustment of the display. -Please take care that the sheet does not extend out of the display side	

* if you need above tools, please contact delivery agent or our sales reps.

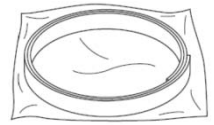
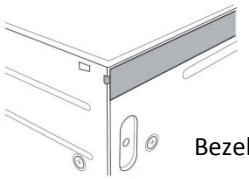
Tools for supporting installation (4)

We will provide following service parts for installation (they are subject to fees)

Name (temporary)	Use	Image
Installation spacer device (UKOG1011MPZZ)	- Insert this spacer between the PN-V601 while installing the neighboring PN-V601s so the units do not touch. And after installation is finished, remove this spacer device.	
Temporary stand （UKOG1004MPZZ）	Temporary stand -This stand is for fixing PN-V601 temporarily to check operation and perform settings before installation. 2 pieces of this stand are necessary per one PN-V601.	
Supply cable for 200 volts **(QACCJA104WJPZ)**	Supply cable for 200 volts -Supply cable for 100 (120V) volts is enclosed in PN-V601 for Japan (US) model. If PN-V601 is used with with 200 volt environment , power supply cable for 200 volts is necessary.	

* if you need above tools, please contact delivery agent or our sales reps.

Tools for supporting installation (5)

Tentative name	Use	Figure Image
Bezel sheet * Bezel sheet is enclosed in PN-V601 package	-Please attach bezel sheets on the 4 sides of the PN-V601 to cover the white areas on the sides of the display. -4 bezel sheets is necessary per one PN-V601(for top / bottom / right / left side). -In order to study the detail on how to attach bezel sheet, please refer to the introduction material enclosed in PN-V601 package (one sheet). -Please note that this sheet can not be put on after setting up the multi-screen display.	 Bezel sheet (Packing image)  Bezel sheet (Attached on PN-V601)

* if you need above tools, please contact delivery agent or our sales reps.

SHARP